the heilmeier catechism
and other things

GSC Global Startup Campus

Renaissance Philanthropy

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20 March 2026
Chiba, Japan 🇯🇵

The Heimies

1. What are you trying to do?
2. How is it done today?
3. What is new in your approach?
4. What's the impact if successful?
5. What are the risks?
6. How much will it cost?
7. How long will it take?
8. What tests will signal success?

the big four

the other guys

1. What are you trying to do?

analogous framings:

- What are you trying to change?
- What's your goal?
- What's your elevator pitch?
- How would you explain this to your mom?

It's easy to know enough about a subject to confuse someone.

Do you know enough to teach them?

2. How is it done today?

analogous framings:

- What are the limits of current practice? Why?

bear in mind:

- “common practice” and “state-of-the-art” can diverge!
- this will segue cleanly into H3

That’s the way we’ve always done it.

It was good enough for my dad and my granddad and it’s good enough for me!

3. What's new in your approach?

analogous framings:

- What are you doing that's new?
- Why will you succeed?
- Why now?
- Why hasn't this been done before?

Oh, so you're the first guy to figure this out?

4. What's the impact if successful?

analogous framings:

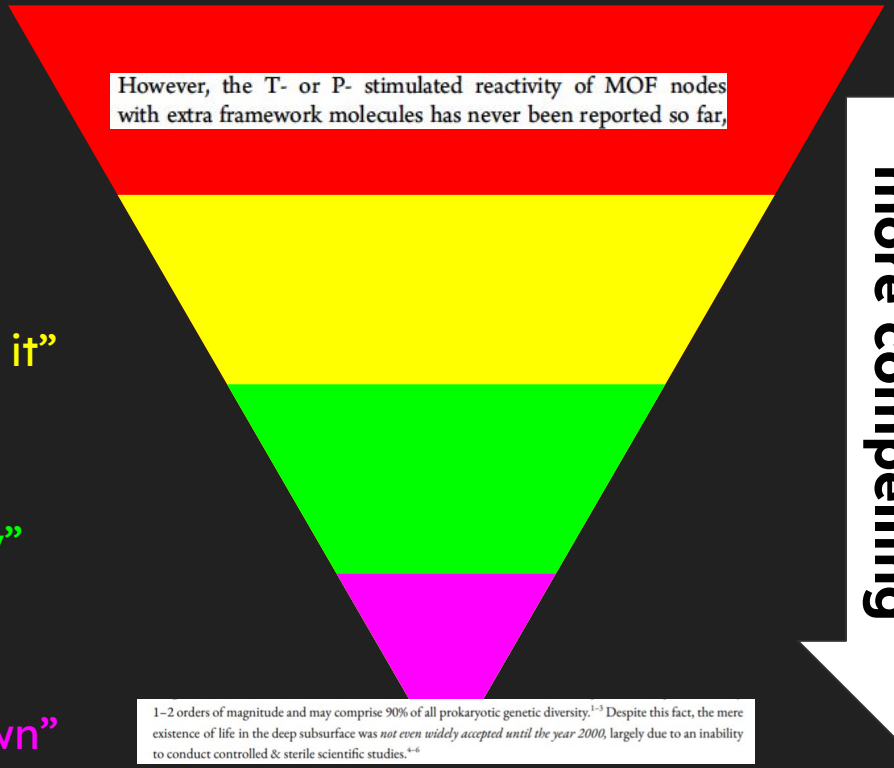
- Who cares?
- What's your vision statement?
- How will the world be different in [10, 20, 50] yrs?

Be quantitative!

Ideally, your units will be 'gigascale': $billions, $GtCO_2$, GW, …

Inherency : *why* does the status quo fall short?

- **Existential inherency**
  - "It hasn't been done because no one's done it"
- **Structural inherency**
  - "It hasn't been done because current systems don't support it"
- **Attitudinal inherency**
  - "It hasn't been done because no one's thought of it this way"
- **Epistemic inherency**
  - "It hasn't been done because we literally couldn't have known"

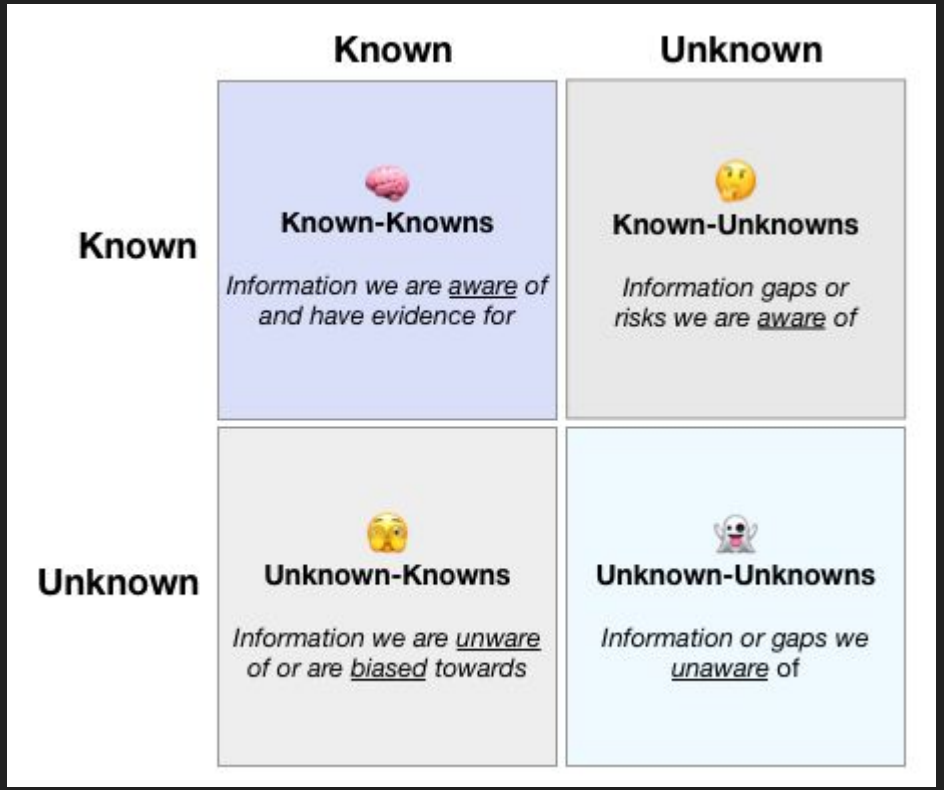


5. What are the risks?

Types of risk:

- Technical
- Programmatic
- Policy
- Financing
- Commercialization
- Transition

Be honest, but remember failure can have silver linings!



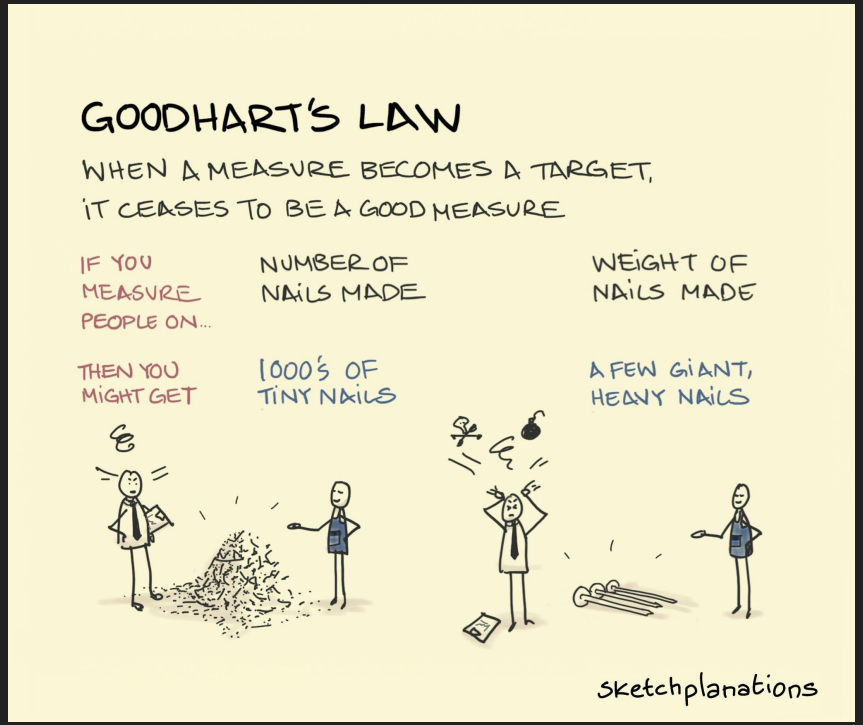
6. How much will it cost?

$10-$100 million, probably

7. How long will it take?

3-5 years,
probably

8. What tests will signal success?



The McNamara Fallacy:

1. Measure what can be easily measured
2. Disregard that which cannot be easily measured
3. Presume that which cannot be easily measured is unimportant
4. Presume that which cannot be easily measured does not exist

and **other things**

BiTS is a sprint, not a marathon

- Program development: make sure your foundations are solid
  - conceptualization: okay to pivot but do it early!
  - read papers: always (don't get caught flat-footed)
  - external outreach: absolutely critical, may inform pivots, front-load this
- Deliverables: be flexible and lean into your personal style
  - Concept note: your primary takeaway show piece
  - Pitch: what people will actually remember
- Small groups are your backbone!
  - keep each other accountable
  - hype each other up

Advice on program outreach:

make a meeting tracker spreadsheet ASAP!

Name	Email	Status	Priority	Contacted	circle back	ask about	Transcript	Referral	Org	Field
[censored]		!met!	high	Wed, Sep 17	[censored]					
		!met!	high	Thu, Sep 18						
		!met!	high	Thu, Sep 18						
		!met!	high	Wed, Sep 24						
		!met!	high	Wed, Sep 24						
		!met!	high	Thu, Sep 25						
		!met!	high	Fri, Sep 26						
		!met!	high	Tue, Sep 30						
		!met!	med	Tue, Sep 30						
		!met!	med	Tue, Sep 30						
		!met!	high	Tue, Sep 30						
		!met!	high	Tue, Oct 14						
		!met!	high	Wed, Oct 15						
		!met!	high	Wed, Oct 15						
		!met!	med	Wed, Oct 15						
		circle back	high	Fri, Oct 17						
		circle back	med	Mon, Sep 22						
		circle back	high	Wed, Oct 8						
		circle back	med	Mon, Sep 15						

Advice on program outreach:

have an email outreach template -- update it as you converge

Hey `[[name]]`,

I hope things `[[at place]]` are going well. I'm reaching out because I'm in the early stages of program development for a science accelerator fellowship called BiTS run by Renaissance Philanthropy in conjunction with the UK's Advanced Research and Innovation Agency (ARIA), and I want to get your professional opinion as I flesh out my program concept.

Here's the one-paragraph summary:

There is almost as much living biomass below the surface of the earth as above it, dominated by communities of anaerobic microbes. Human intervention into these ecosystems (such as CO_2 injections for carbon sequestration or enhanced oil recovery) upsets their natural equilibria and can produce inadvertent fluxes of methane, hydrogen, and ammonia. Instead of leaking these contaminants into the environment, I am developing a research program to understand and engineer the subsurface production of valuable industrial chemicals at scale.

I fell down this rabbit hole after learning about the stimulation of microbial methanogenesis following CO2 injections for enhanced oil recovery, but beyond fugitive methane risks I'm curious if this kind of biogeochemistry can be deliberately harnessed. I'm reaching out because of your particular expertise in `[[area of expertise]]`, following a specific referral from `[[recommender name]]`. In particular, I would love to get your take on `[[methanogenesis risks in EOR-CCUS and potential implications on MRV/geophysics of subsurface biogeoreactors/characterization of subsurface microbiomes/genetic engineering of anaerobic microbes]]`, among other things.

Please let me know if you would be willing to spare half an hour (or more!) in the upcoming few weeks to chat more about this topic and share your perspectives. I'd love to hear more about your work so that your knowledge can help inform the research program I am designing. If you're interested, please feel free to **grab a slot on my personal calendar**, or let me know if there is some time that is more preferable for you. I would also welcome any recommendations for other field experts or interesting people you think I should be talking to!

Best,
Jo

Advice on program outreach:

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Hello `[[name]]`,

I hope you're doing well! I wanted to thank you for your invaluable feedback on the deep biogeochemistry program concept I've been developing, which has greatly informed my thinking as the pitch has evolved.

I'm reaching out because I am beginning to converge on a program structure that I will be ultimately pitch ARIA on Dec 8: I'm asking for a £50M program, roughly 2/3 (~£35M) of which will be for direct project funding, and the remaining 1/3 (~£15M) to establish what I'm calling a "testbed consortium" to negotiate and manage collective access for performers to a variety of industrial borehole sites (including O&G wells, CCS reservoirs, GeoH2 sites, etc). You can find some more specific details in my draft concept note (pdf also attached).

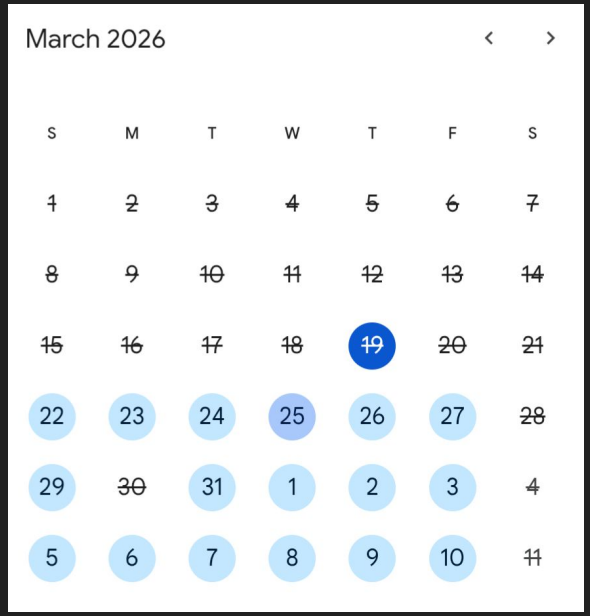
If you have a spare moment, I would love to hear your honest opinion on this program structure — how useful would such testbed access be for you? What kinds of resources / site access would be most transformative for your work? What kinds of downhole environments are you most interested in? What kinds of experiments would you run if you didn't have to go through the headache of getting site access? What kind of instrumentation capabilities do you fantasize about? Is there some essential element that I'm missing, or is there a superfluous element I'm overemphasizing?

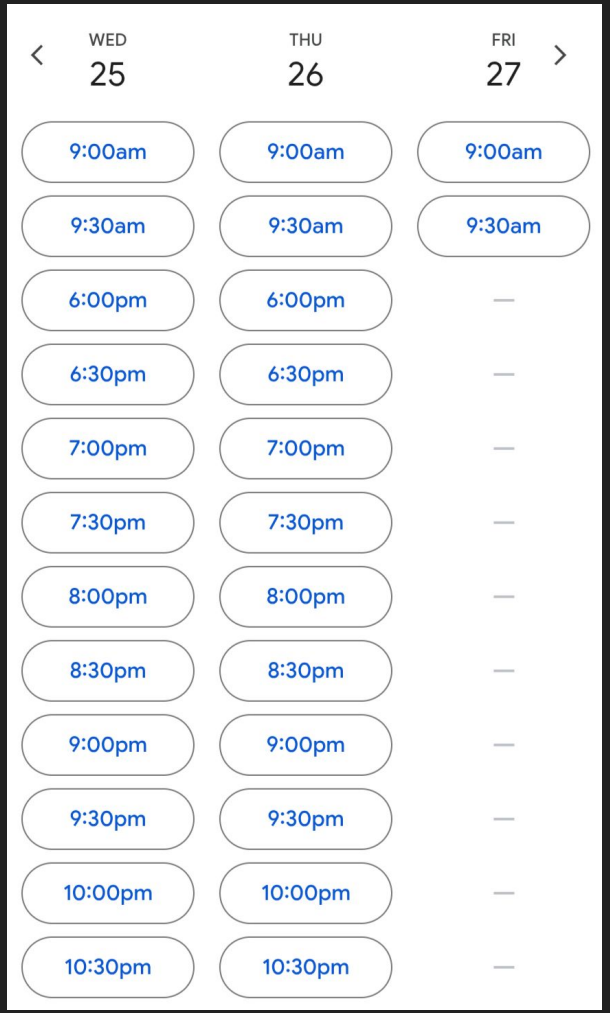
I would love to get your feedback by whatever means are most convenient for you — you can provide comments on the raw doc at this link, I'm happy to schedule a call, or you can simply vomit your unedited stream-of-consciousness reaction as a reply to this email. As always, your professional expertise is deeply appreciated. I'm optimistic that we can gather the resources scientists like you need to revolutionize our understanding of the subsurface!

Couldn't do this without you,
Jo

Advice on program outreach:

Set up an automatic meeting calendar with availability for people in global timezones!

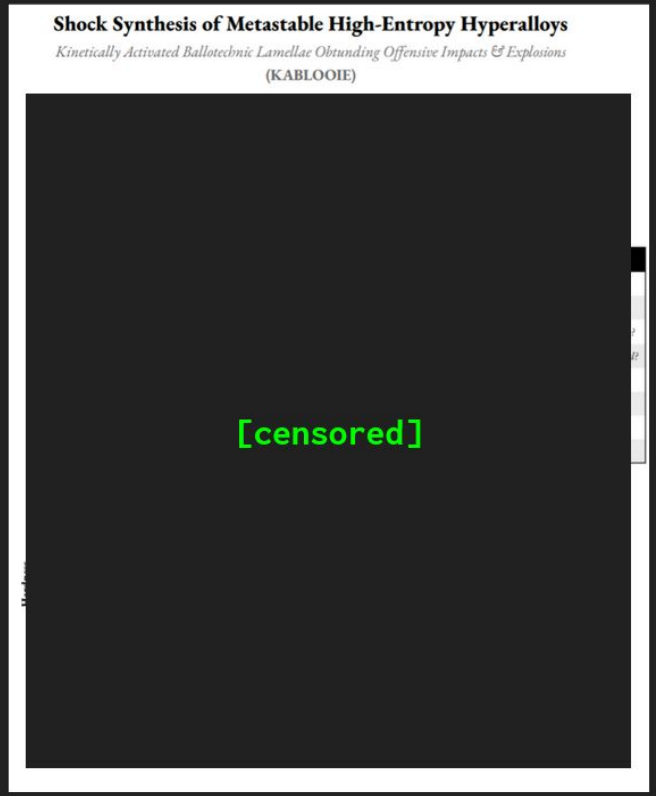




a good concept note...

- is skimmable
- is memorable
- is thorough
- good title (acroname optional but encouraged)
- have a concise abstract / bottom line up front (BLUF)
- aesthetics matter! nice font, tasteful text layout and formatting
  - mix of paragraphs, tables, bullets, figures
  - try to escape the AI-written memo local minimum (bullet-brained, too much bolding)
- 2 pages of content, 1 page of references + supplementary info
  - first page is most important, only one most people will read
  - supplementary info: gantt charts, milestone tables, etc

a good concept note...



The Heilmeier Catechism

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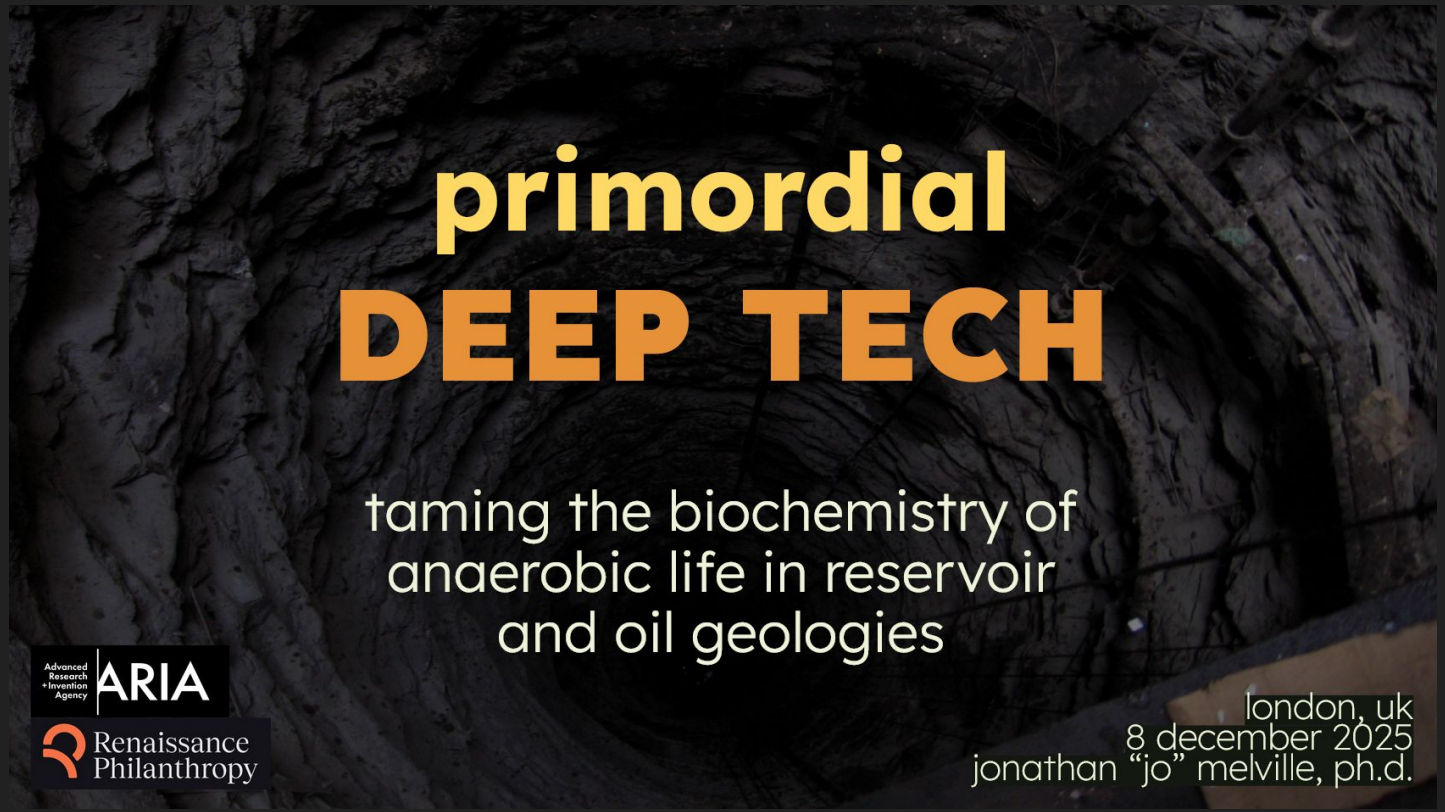
8. *What tests will signal success?*

[censored]

a good pitch...

- is informative
- is intriguing
- is fun!
- know your audience (target technical depth)
- lean into your personal style
- overindex on *a-ha!* figures and graphics — steal or make your own
- script/voicetrack should diverge from slide text
- PRACTICE!
  - memorize your intro script, key transitions/money shots, conclusions
  - practice alone and with your small groups -- get lots of feedback
  - know your timing and manage it well

a good pitch...


primordial
DEEP TECH
taming the biochemistry of
anaerobic life in reservoir
and oil geologies
Advanced Research + Invention Agency
ARIA
Renaissance Philanthropy
london, uk
8 december 2025
jonathan "jo" melville, ph.d.

Gantt chart of my BiTS experience

(Fall 2025, UK/ARIA Cohort)